REMARKS

Reconsideration is respectfully requested.

In the Office Action, the Examiner noted that claims 1, 3, 4, 6, 7, 9-11, 16-22 and 25-27 are pending, and that claims 1, 3, 4, 6, 7, 9-11, 16-22, and 25-27 are rejected. By this response, claims 1 and 25 have been amended; and new claims 28-32 have been added. Thus, claims 1, 3, 4, 6, 7, 9-11, 16-22, and 25-32 are pending in this application for consideration.

Rejections Under 35 U.S.C., §103

Claims 1, 3, 4, 6, 7, 9-11, 16-22, and 25-27 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Murad, et al.* (U.S. Patent No. 6,526,389) in view of *McDonough, et al.* (U.S. Patent No. 6,115,693).

Claim 1 recites, in part, wherein the behavior profiles are provided as two input calling pattern cubes, C_1 and C_2, and a similarity cube, C_s, is an output of a comparison between C_1 and C_2, wherein the similarity cube, C_s, represents a pair of corresponding sub-cubes of C_1 and C_2, and wherein C_1 and C_2 are count-cubes, a sub-cube is treated as a bag, and cell-wise comparison results are summarized based on bag overlap. See, for example, page 14, lines 22-26, and page 15, lines 13-18 of the present specification for additional details regarding this feature.

On page 3, last paragraph, of the present Office Action, the Examiner asserts that *Murad* discloses the above-recited feature of claim 1. Further, on page 15, first full paragraph of the Office Action, the Examiner further asserts that Murad's col. 5, lines 52- col. 6, line 5 discloses "that the sub-cubes are each treated as a bag, and cell-wise comparison results are summarized based on bag overlap." The above assertions are respectfully traversed.

Murad at col. 5, lines 52 to col. 6, line 5 discloses a Cumulative Distribution (CD) based distance function to determine a distance between two continuous probability distributions $f_1(x)$ and $f_2(x)$. Murad's clustering operation performs steps identified by equations 1-3 shown in col. 5 and col. 6 to determine whether or not a daily profile is close enough to any of the existing clusters. There is no relationship between Murad's "distance factor based on

the Cumulative Distribution determined during a clustering operation" and "sub-cube is treated as a bag, and cell-wise comparison results are summarized based on bag overlap" as recited in claim 1.

The Examiner also alleges that Murad's "distance factor based on the Cumulative Distribution represents bag overlap using probability distribution-based calling pattern since when calculating the distance factor, if the value is negative, then the daily profiles {represented by cells} would overlap." The Examiner is mistaken in making such assertion.

Murad at col. 7, lines 58-65 discloses

> "if the distance does not exceed the threshold (step 706), the second stage of analyzing the quantitative profile is carried out. In this stage, the quantitative profile is obtained (step 706), and is compared with the third level profile on the basis of the following (step 708): a mean value of the daily prototype closest to the examined daily profile, a standard deviation of the daily prototype closest to the examined daily profile, and a predetermined threshold value." (Emphasis Added)

Further, Murad at col. 8, lines 10-15 discloses

> "If the predetermined threshold value is not exceeded as determined in step 710, then the daily profile under examination is not identified as fraudulent or unusual. However, if any of the above equations (3) or (4) do not hold true, then the daily profile is marked as fraudulent or unusual, and/or an alert is initiated (step 712). According to this aspect of the present invention, the deviation from the normal calling behavior as described above represents a genuine dissimilarity between any two instances of the second level profile. The genuine dissimilarity is assured by the application of the CD-distance function." (Emphasis Added)

As can be seen from the above, Murad fails to teach or suggest a sub-cube being treated as a bag, and cell-wise comparison results being summarized based on bag overlap as recited in claim 1.

Furthermore, claim 1 also specifically recites that input calling pattern cubes C_1 and C_2 are count-cubes. Count-cubes are defined as special kind of cubes whose cell-values are non-negative integers for measuring counts. See page 14, lines 21-25 of the present specification. Murad fails to teach or suggest this limitation as well. In fact, Murad fails to even mention anything remotely related to cubes, sub-cubes, cells, or overlap in any manner.

In addition to the above, amended claim 1 recites the count cubes having non-negative integer cell values, and the bag overlap enables comparison of corresponding sub-cubes of distinct count cubes. Murad fails to teach or suggest this claim feature.

McDonough fails to cure Murad's deficiencies as noted above. Even if McDonough is combined with Murad, all the elements of claim 1 are not met.

Claim 1 is therefore believed to be allowable.

As claims 3-4, 6-7, 9-10, 22, and 32 depend from claim 1, they too are allowable.

Claim 11 recites, in part, compute the customer telephone calling behavior profiles using OLAP operations on multi-dimensional and multi-level data cubes, one multi-level data cube being a profile cube, another multi-level data cube being a profile-snapshot cube, and yet another data cube being a profile cube formed by merging together the profile cube and the profile-snapshot cube; treating a sub-cube as a bag, and summarizing cell-wise comparison results based on bag overlap.

Page 7, first paragraph of the Office Action asserts Murad's third level overall profile (col. 7, lines 3-17) is similar to "yet another data cube being a profile cube formed by merging together the profile cube and the profile-snapshot cube." However, Murad's col. 7, lines 3-17 fails to teach or suggest such. It merely discloses that the third level is generated on the basis of the extracted daily prototypes, and that each entry of record 500 contains 3 fields, the third field 506 is the sum of squared quantitative profiles. There is no teaching or suggestion that the third level profile is formed by merging the first and second level profiles as asserted by the Examiner.

Moreover, as demonstrated with respect to claim 1, Murad fails to teach or suggest "treating a sub-cube as a bag, and summarizing cell-wise comparison results based on bag overlap." McDonough fails to cure Murad's deficiencies.

In view of the above, claim 11 is believed to be allowable.

As claim 16 depends from claim 11, it too is allowable.

Claim 17 is allowable at least for similar reasons set forth above with respect to claim 11.

As claims 18-21 depend from claim 17, they too are allowable.

For example, claim 21 includes additional patentable subject matter and recites "retrieving profile tables to generate the profile cubes, retrieving call data tables to create profile-snapshot cubes that have a same dimension of a profile cube to facilitate merging by addition." (Emphasis Added)

On page 11, in the fifth paragraph of the present office action, the Examiner asserts that Murad's "col. 10, lines 24-25, represented by the first behavior profile for each cluster" teaches the above-recited feature of claim 21. The Examiner is mistaken.

Murad at col. 10, lines 24-25 disclose "determining a prototypical first behavior profile for each cluster." There is no teaching or suggestion regarding "retrieving tables to create profile-snapshot cubes that have a same dimension of a profile cube to facilitate merging by addition." Where does Murad teach about creating profile-snapshot cubes that have a same dimension of a profile cube? Murad fails to mention anything that is remotely relevant to cubes. Therefore, the question of retrieving cubes that have a same dimension of a profile cube does not even arise.

In view of the above, Applicants respectfully submit that claim 21 presents additional patentable subject matter and therefore is believed to be allowable.

Claim 25 is allowable at least for similar reasons set forth above with reference to claims 1 and 11 in addition to its own independently recited features.

As claims 26-27 depend from claim 25, they too are allowable.

In this response, new claims 28-32 are added. Support for such claims may be found at least page 10, lines 25-30, page 14, lines 1-5 and 20-25 of the present specification.

Claim 28 recites, in part, wherein each cell of C_s represents the similarity of a pair of corresponding sub-cubes, a cube having a set of dimensions and each cell of the cube being identified by a value from each of the dimensions.

In addition to the deficiencies noted above with reference to claim 1, neither Murad nor McDonough teach or suggest the above recited feature of claim 28. Claim 28 is therefore allowable.

Claim 29 depends from claim 28 and further recites "wherein an element of the bag is identified by a list of dimension values underlying a cell of the cube, and a count of the element is represented by a cell value." None of the references of record either alone or in combination teach or suggest such claim feature. Claim 29 therefore includes additional patentable subject matter and is allowable.

Claim 30 depends from claim 28 and further recites "wherein the count cubes having non-negative integer cell values, and the bag overlap enables comparison of corresponding sub-cubes of distinct count cubes." None of the references of record either alone or in combination teach or suggest such claim feature. Claim 30 therefore includes additional patentable subject matter and is allowable.

Claim 31 depends from claim 28 and further recites "wherein each cell of C_s represents the similarity of a pair of corresponding sub-cubes." None of the references of record either alone or in combination teach or suggest such claim feature. Claim 31 therefore includes additional patentable subject matter and is allowable.

Claim 32 depends from claim 1 and is therefore allowable.

CONCLUSION

For all the reasons advanced above, Applicant respectfully submits that the application is in condition for allowance, and action to that end is respectfully requested. If the Examiner's next anticipated action is to be anything other than a Notice of Allowance, the undersigned respectfully requests a telephone interview before issuance of any such subsequent action.

Respectfully submitted,

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